

Industrial and Systems Engineering Seminar

Auctions for Online Display Advertising Exchanges: Approximations and Design

Wednesday, March 12

3:15 PM – Refreshments before the Seminar

3:30 PM – Graduate Seminar

Mechanical Engineering Room 4125 A & B



Professor Omar Besbes

Associate Professor

Graduate School of Business - Columbia University

Ad Exchanges are emerging Internet markets where advertisers may purchase display ad placements, in real-time and based on specific viewer information, directly from publishers via a simple auction mechanism. Advertisers join these markets with a pre-specified budget and participate in multiple second-price auctions over the length of a campaign. This paper studies the competitive landscape that arises in Ad Exchanges and the implications for publishers' decisions. The presence of budgets introduces dynamic interactions among advertisers that need to be taken into account when attempting to characterize the bidding landscape or the impact of changes in the auction design. To this end, we introduce the novel notion of a Fluid Mean Field Equilibrium (FMFE) that is behaviorally appealing, computationally tractable, and in some important cases yields a closed-form characterization. We establish that a FMFE approximates well the rational behavior of advertisers in these markets. We then show how this framework may be used to provide sharp prescriptions for key auction design decisions that publishers face in these markets. In particular, we show that ignoring budgets, a common practice in this literature, can result in significant profit losses for the publisher when setting the reserve price.

Bio: Omar Besbes is the *Philip H. Geier Jr. Associate Professor of Business* in the Decision, Risk and Operations division at the Graduate School of Business, Columbia University. He has taught the core MBA courses in Operations Management and Business Analytics as well an MBA elective on advanced Business Analytics. His primary research interests are in the area of decision-making under model uncertainty with a focus on applications in e-commerce, pricing and revenue management, online advertising, operations management and service systems.

His research has been recognized by the 2012 INFORMS Revenue Management and Pricing Section prize and the 2013 M&SOM best paper award. He has also received the Dean's award at Columbia Business School for teaching excellence for the Operations Management core course. Before joining Columbia in July 2009, he was on the faculty at the Wharton School, University of Pennsylvania.